

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A radio communication apparatus comprising:

an antenna;

a transmitting apparatus of outputting a transmitting signal in a first frequency band;

a duplexer, connected to said ~~first~~-antenna and having a single-phase input terminal and a balanced output terminal, of conveying said transmitting signal inputted to said single-phase input terminal to said ~~first~~-antenna and outputting a receiving signal in a second frequency band different from said first frequency band received from said ~~first~~-antenna substantially as a differential signal from said balanced output terminal; and

a receiving apparatus connected to said balanced output terminal and having a circuit in which a gain of a signal of a differential component is higher than that of a signal of an in-phase component, or a loss of the signal of the differential component is lower than that of the signal of the in-phase component.

2. (Currently Amended) The radio communication apparatus according to claim 1, wherein said ~~first~~-duplexer has a first phase shifter, a second phase shifter, a third phase shifter, a fourth phase shifter, a fifth phase shifter and a sixth phase shifter;

said antenna is connected to said first phase shifter and said second phase shifter;

said receiving apparatus is connected to said first phase shifter and said second phase shifter via said third phase shifter and said fourth phase shifter respectively;

said transmitting apparatus is connected to said first phase shifter and said second phase shifter via said fifth phase shifter and said sixth phase shifter respectively;

said third phase shifter and said fourth phase shifter are connected to said fifth phase shifter and said sixth phase shifter respectively;

a difference in a phase shifting amount between said first phase shifter and said second phase shifter is substantially 90 degrees;

the difference in the phase shifting amount between said third phase shifter and said fourth phase shifter is substantially 90 degrees; and

the difference in the phase shifting amount between said fifth phase shifter and said sixth phase shifter is substantially - 90 degrees.

3. (Currently Amended) A ~~first~~ duplexer comprising a single-phase input terminal connected to a transmitting apparatus and a balanced output terminal connected to a receiving apparatus, wherein:

said transmitting apparatus outputs a transmitting signal in a first frequency band, conveys said transmitting signal inputted to said single-phase input terminal to an antenna and outputs a receiving signal in a second frequency band different from said first frequency band received from said antenna substantially as a differential signal to said balanced output terminal; and

said receiving apparatus has a circuit in which a gain of a signal of a differential component is higher than that of a signal of an in-phase component, or a loss of the signal of the differential component is lower than that of the signal of the in-phase component.

4. (Currently Amended) An antenna apparatus comprising:

one antenna having a first feeding point of feeding a receiving signal and also having two or more polarized waves; and

another antenna placed along with said one antenna and having a second feeding point of feeding the receiving signal and also having two or more polarized waves, wherein:

said first feeding point is placed substantially on an exciting direction side of the receiving signal of said ~~another one~~ antenna; and

said second feeding point is placed substantially on an opposite side to the exciting direction of the receiving signal of said another antenna.

5. (Previously Presented) The antenna apparatus according to claim 4, wherein said one antenna has a third feeding point of feeding a transmitting signal;

said another antenna has a fourth feeding point of feeding a transmitting signal;

said third feeding point is placed substantially on an opposite side to the exciting direction of the transmitting signal of said one antenna; and

said fourth feeding point is placed substantially on the opposite side to the exciting direction of the transmitting signal of said another antenna.

6. (Previously Presented) A radio communication apparatus comprising:

a transmitting apparatus of outputting a transmitting signal;

the antenna apparatus according to claim 5;

a duplexer, connected to said one antenna and said another antenna and having a single-phase input terminal and a balanced output terminal, of conveying said transmitting signal inputted to said single-phase input terminal to said one antenna and said another antenna and outputting a receiving signal received by said one antenna and said another antenna from said balanced output terminal; and

a receiving apparatus connected to said balanced output terminal and having a circuit in which a gain of a signal of a differential component is higher than that of a signal of an in-phase component, or a loss of the signal of the differential component is lower than that of the signal of the in-phase component.

7. (Currently Amended) A radio communication apparatus comprising:

~~a~~ an antenna;

a transmitting apparatus of outputting a transmitting signal as a differential signal;

a duplexer, connected to said antenna and having a balanced input terminal and a single-phase output terminal, of conveying said transmitting signal inputted to said balanced input terminal as a single-phase signal to said antenna and outputting a single-phase receiving signal received by said antenna to said single-phase output terminal; and

a receiving apparatus connected to said single-phase output terminal.

8. (Previously Presented) The radio communication apparatus according to claim 7, wherein said duplexer has a first phase shifter, a second phase shifter, a third phase shifter, a fourth phase shifter, a fifth phase shifter and a sixth phase shifter;

said antenna is connected to said first phase shifter and said second phase shifter;

said receiving apparatus is connected to said first phase shifter and said second phase shifter via said third phase shifter and said fourth phase shifter respectively;

said transmitting apparatus is connected to said first phase shifter and said second phase shifter via said fifth phase shifter and said sixth phase shifter respectively;

said third phase shifter and said fourth phase shifter are connected to said fifth phase shifter and said sixth phase shifter respectively;

a difference in a phase shifting amount between said first phase shifter and said second phase shifter is substantially - 90 degrees;

the difference in the phase shifting amount between said third phase shifter and said fourth phase shifter is substantially 90 degrees;

the difference in the phase shifting amount between said fifth phase shifter and said sixth phase shifter is substantially - 90 degrees.

9. (Currently Amended) A radio communication apparatus comprising:

one and another antennas;

a transmitting apparatus of outputting a transmitting signal as a differential signal;

a duplexer, connected to said one antenna and said another antenna and having a balanced input terminal and a single-phase output terminal, of conveying said transmitting signal inputted to said balanced input terminal to said one antenna and said another antenna and outputting a receiving signal received by said one antenna and said another antenna as a single-phase signal to said single-phase output terminal; and

a receiving apparatus connected to said single-phase output terminal, and wherein said one and another antennas are formed and placed to radiate said transmitting signal substantially as the differential signal and convey said receiving signal substantially as an in-phase signal to said duplexer.

10. (Previously Presented) The radio communication apparatus according to claim 9, wherein said one and another antennas are formed and placed to convey said receiving signal as the differential signal to said duplexer instead of being formed and placed to convey said receiving signal as an in-phase signal to said duplexer; and

said duplexer converts said receiving signal inputted as the differential signal into the in-phase signal and outputs it as the single-phase signal to said single-phase output terminal.

11. (Previously Presented) A radio communication apparatus comprising:

one and another antennas;

a transmitting apparatus of outputting a transmitting signal as a differential signal;

a duplexer, connected to said one antenna and said another antenna and having a balanced input terminal and a balanced output terminal, of conveying said transmitting signal inputted to said balanced input terminal to said one antenna and said another antenna and outputting a receiving signal received by said one antenna and said another antenna as the differential signal to said balanced output terminal, and outputting a part of said transmitting signal substantially as an in-phase signal to said balanced output terminal; and

a receiving apparatus connected to said balanced output terminal and having a circuit in which a gain of a signal of a differential component is higher than that of a signal of an in-phase component, or a loss of the signal of the differential component is lower than that of the signal of the in-phase component.

12. (Currently Amended) The radio communication apparatus according to claim 11, wherein said duplexer has a first phase shifter, a second phase shifter, a third phase shifter, a fourth phase shifter, a fifth phase shifter and ~~an~~a sixth phase shifter;

said one antenna and said another antenna are connected to said first phase shifter and said second phase shifter respectively;

said receiving apparatus is connected to said first phase shifter and said second phase shifter via said third phase shifter and said fourth phase shifter respectively;

said transmitting apparatus is connected to said first phase shifter and said second phase shifter via said fifth phase shifter and said sixth phase shifter respectively;

said third phase shifter and said fourth phase shifter are connected to said fifth phase shifter and said sixth phase shifter respectively;

a difference in a phase shifting amount between said first phase shifter and said second phase shifter is substantially - 90 degrees;

the difference in the phase shifting amount between said third phase shifter and said fourth phase shifter is substantially 90 degrees; and

the difference in the phase shifting amount between said fifth phase shifter and said sixth phase shifter is substantially 90 degrees.

13. (Previously Presented) The radio communication apparatus according to any one of claims 1, 6, 11 and 12, wherein said receiving apparatus has an amplifier in which the gain of the signal of the differential component is higher than that of the signal of the in-phase component.

14. (Previously Presented) The radio communication apparatus according to any one of claims 1, 6, 11 and 12, wherein said receiving apparatus has a filter in which the loss of the differential signal is lower than that of the signal of the in-phase component.

15. (Previously Presented) The radio communication apparatus according to claim 13, wherein said receiving apparatus has a down mixer of down-converting said receiving signal being connected to a subsequent stage to said amplifier; and

said down mixer has the gain of the differential signal higher than that of the signal of the in-phase component or the loss of the differential signal lower than that of the signal of the in-phase component.

16. (Original) The radio communication apparatus according to claim 15, having:

a first transistor of having one of the receiving signals as said differential signals inputted to a base side thereof; and

a second transistor of having the other of the receiving signals as said differential signals inputted to the base side thereof, and wherein:

an emitter side of said first transistor is connected to an emitter side of said second transistor; and

a connection point thereof is connected to a ground via a first inductor having a predetermined inductance.

17. (Previously Presented) A radio communication apparatus comprising:

a transmitting apparatus of outputting a transmitting signal;

an antenna apparatus;

a duplexer, connected to said antenna apparatus and having a single-phase input terminal and a balanced output terminal, of conveying said transmitting signal inputted to said single-phase input terminal to said antenna apparatus and outputting a receiving signal received by said antenna apparatus from said balanced output terminal; and wherein:

said duplexer has an impedance for a differential signal in a frequency band of said receiving signal higher than the impedance for a single-phase signal in the frequency band of said transmitting signal.

18. (Previously Presented) The radio communication apparatus according to claim 17, wherein said duplexer does not substantially pass the differential signal in the frequency band of said receiving signal but passes the single-phase signal in the frequency band of said transmitting signal substantially without a loss.

19. (Previously Presented) The radio communication apparatus according to claim 18, wherein said duplexer has two $1/4$ wavelength lines having length of substantially $1/4$ of the wavelength of the frequency band of said receiving signal, and said single-phase signal is conveyed to one side of each of said $1/4$ wavelength lines and said antenna apparatus is connected to the other side of each of said $1/4$ wavelength lines.

20. (Previously Presented) The radio communication apparatus according to claim 17, wherein said duplexer has a parallel resonance circuit to which said single-phase signal is conveyed at a middle point of the impedance thereof, and said parallel resonance circuit resonates in the frequency band of said receiving signal.

21. (Currently Amended) A radio communication method comprising the steps of:

conveying to ~~a~~an antenna a transmitting signal in a first frequency band inputted to a single-phase input terminal of a duplexer;

outputting a receiving signal in a second frequency band different from said first frequency band received from said antenna substantially as a differential signal from a balanced output terminal of said duplexer; and

as to said receiving signal substantially outputted as the differential signal, rendering a gain of a signal of a differential component higher than that of a signal of an in-phase component, or rendering a loss of the signal of the differential component lower than that of the signal of the in-phase component.

Respectfully submitted,



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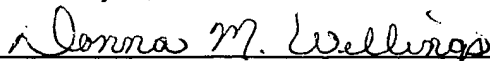
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